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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|-----------------|-------------|----------------------|---------------------|------------------|
| 09/889,351 | 07/17/2001 | Steven Pedersen | 4320-350 | 2663 |

7590 01/15/2004
Bereskin & Parr
Box 401 40 King Street West
Toronto Ontario, MSH 3Y2
CANADA

EXAMINER

FORTUNA, ANA M

| ART UNIT | PAPER NUMBER |
|----------|--------------|
|----------|--------------|

1723

DATE MAILED: 01/15/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

| | | |
|-----------------|-----------------|--|
| Application No. | Applicant(s) | |
| 09/889,351 | PEDERSEN ET AL. | |
| Examiner | Art Unit | |
| Ana M Fortuna | 1723 | |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
 Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on 29 October 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 21-25 and 27-32 is/are pending in the application.
- 4a) Of the above claim(s) 27-32 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 21-25 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 13) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.
- a) ☐ The translation of the foreign language provisional application has been received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 10/29/03.
- 4) ☐ Interview Summary (PTO-413) Paper No(s) _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 21-25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Zha et al (6,156,200)(hereinafter '200) in view of Cote et. al. (5,248,424)(hereinafter '424), and Miyashita et al (6,511,602 B1). References '200, '602 and '424 have both been discussed in paper No. 6. '200 fails to teach the membrane surface area for every square meters of horizontal area of the tank. packing the module with 11,000 fibers is although disclosed (column 6, lines 34-36). Cote teaches disposing hollow fiber arrangement or modules in horizontal position with respect to the tank (Figures 9A-10), and further teaches suitable ranges of membrane surface areas per volume of substrate contained in the tank; membranes modules with large surface area are suggested, the performance as based on the sum of surface area of the skein is also discussed (column 6, lines 4-11, last paragraph bridging with first paragraph of page 7). Arrangement with up to 1000 M2 of membrane and more are suggested for a reservoir having a volume in excess to 100 to 1000 liters (column 10, lines 34-37, and 60-68, column 11, lines 1-7). For a selected membrane surface area, and volume of the reservoir, as suggested in '424 for an horizontal membrane arrangement, one skilled in the art at the time the invention was made would have been motivated to modify the

structure of the reservoir, e.g. cross sectional area, height, to reach a predetermined suitable volume, and further select the tank cross-sectional area based on membrane length. "424 suggest fibers with a length greater than 0.5 meters, each fiber with surface area greater than 1 M² (column 27, lines 19-24). Therefore, selecting a tank with a diameter greater than 0.5 meters will be required to fit the horizontal membranes, selecting the height based on the volume required for the predetermined membrane area will be within the knowledge of the skilled artisan. From the information disclosed in '424 above, several ranges of at least 500 square meters for every square meter of horizontal cross sectional area can result depending on the membrane surface area selected. **Furthermore, from the tank volume, e.g. 1000 liters, at a pre-selected height of the tank, the diameter of the tank can be calculated, and for a cylindrical container or vessel, for example, the cross sectional can be calculated, dividing the membrane surface area, e.g. by the cross sectional area, the number of membrane modules having a predetermined surface area can be calculated, adjusting the cross sectional area to fit a particular number of membrane modules having 500 M² per square meter of horizontal cross sectional area of the tank will have been obvious to one skilled in the art at the time the invention was made, reference '424 teaches selecting a tank of arbitrary proportions, therefore, selecting a desire high and tank diameter for the membrane area it would have been obvious to one skilled in the art at the time the invention was made.** Selecting the number of modules with a predetermined membrane surface area per cross section area, or packing density depends on permeability and rejection properties

of the membranes, and on the conditions of the substrate, it would have been also obvious to one skilled in the art at the time the invention was made, based on '424's teaching (column 6, lines 25-60), the adjust the membrane area per horizontal cross sectional area of the tank, depending on the above discussed factors.

Reference '602 is cumulative as suggesting a packing density of 500M²/M³ in a horizontal arrangement of membranes for a minimum volume surrounding the membranes (column 6, lines 30-39).

It would have been obvious to one skilled in the art at the time the invention was made to provide a hollow fiber membrane arrangement in a tank including the substrate inlet, gas inlet and retentate discharge (at the top of the module) as suggested in '200, and further provide the tank with an horizontal arrangement o hollow fibers, since alternative arrangements for treating a substrate in presence of gas are suggested in the prior art, as discussed above.

Response to Arguments

3. Applicant's arguments filed 10/29/03 have been fully considered but they are not persuasive. The limitation of surface are per horizontal cross section is not specifically disclosed in the prior art, however can be obtained from different tanks or reservoir configurations having a volume and horizontal membranes packing density within the ranges suggested in reference' 424, as discussed in detail above.

Conclusion

4. THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

1. Applicant's election with traverse of in Paper No. 8 is acknowledged. The traversal is on the ground(s) that the process claims 27-32 includes the apparatus technical features. This is not found persuasive because the apparatus of claims 21-25 can be operated in distinct process steps other than following the sequence of steps claimed in claims 27-32. However, claims 27-32 can be rejoined to claims 21-25 after determination of its allowability.

The requirement is still deemed proper and is therefore made FINAL.

6Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ana M Fortuna whose telephone number is (571) 272-1141. The examiner can normally be reached on 9:30-6:00 M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wanda L. Walker can be reached on (571) 272-1151. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0661.



Ana M Fortuna
Primary Examiner
Art Unit 1723

AMF
January 12, 2004